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TO: Distribution List

Attached is the report to the Chairs of the Senate and Assembly fiscal committees on the Department of Water Resources' (DWR) annual carbon footprint of DWR's total operations. This is a supplemental report required by the 2007 Budget Act (Item 3860-001-0001), dated August 2007.

The report discusses the State Water Project's 2006 energy portfolio, including its own hydroelectric generation and associated carbon emissions. Also discussed are DWR's efforts to quantify emissions from all of its 2007 operations and its progress in reporting this data to the California Climate Action Registry.

If you have any questions, please contact me at (916) 653-7007 or your staff may contact Raphael Torres, Deputy Director for the State Water Project at (916) 653-8043.

Sincerely,

Lester A. Snow
Director

Attachments

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The California Department of Water Resources Report to the California State Legislature On the Estimated Carbon Footprint of Its Total Operations

Introduction

Under the California Budget Act (Act) of 2007, Item 3860-001-0001 specifies that the Department of Water Resources (DWR) report its annual carbon footprint of DWR's total operations.[1] In compliance with the Act, this report includes an analysis of its State Water Project (SWP) operations in 2006, which is the most recent year with complete SWP meter and market data available for analysis. It also documents DWR's progress in calculating and reporting its estimated carbon dioxide (CO_2) emissions for 2007. Please note that this report focuses on 2006 SWP operations; however, the report also documents DWR's progress in calculating and reporting its estimated CO_2 emissions for 2007.

As discussed below, DWR will submit to the California Climate Action Registry (CCAR) its 2007 emissions from its facilities, vehicles, etc., by June 2008. DWR is also evaluating its metered and market data to identify trends in energy usage and emissions associated with its legislatively mandated responsibilities. Lastly, DWR is conducting an internal review of its energy resources to assess the measures DWR can take to meet the Governor's Executive Order S-3-05 (The Impacts of Climate Change) and Assembly Bill (AB) 32 – The Global Warming Solutions Act of 2006.

Legislative Overview

Senate Bill (SB) 1771 authorized the Resources Agency to establish the CCAR to record voluntary greenhouse gas (GHG) emission reductions by California entities after 1990. SB 527 finalized the structure for the CCAR and directed the Resources Agency, the California Energy Commission (CEC), and the California Air Resources Board (ARB) to provide support for the CCAR, and guidance on emissions protocols, certification, baselines, and inventories.

Executive Order S-3-05 was signed on June 1, 2005, to establish GHG emission reduction targets for California. By January 2006, and biannually thereafter, the California Environmental Protection Agency (CalEPA) must report on progress in meeting GHG emission targets:

By 2010: Emissions Reduced to 2000 Levels
By 2020: Emissions Reduced to 1990 Levels
By 2050: Emissions Reduced to 80 percent below 1990 Levels

AB 32 formally recognizes that global warming poses a serious threat to California's natural resources, including the Sierra snow pack, and damage to marine ecosystems and the environment. State agencies must consider and implement strategies to reduce

[1] http://www.lao.ca.gov/2007/supp_report/supp_rpt_2007.pdf

GHG emissions. AB 32 mandates the reversal of California's GHG emissions to 1990 levels by 2020, and the ARB to adopt compulsory regulations for reporting and verification of statewide GHG emissions by January 1, 2008. The standards and protocols developed by the CCAR are to be incorporated to the maximum extent feasible.

DWR Membership in the California Climate Action Registry

In June 2007, DWR joined the CCAR and will report its 2007 GHG emissions associated with its operations, including all direct and indirect emissions through CCAR by June 2008. DWR will quantify and evaluate its overall energy use and GHG emissions each year thereafter by performing the following:

1. Measure and record its annual and baseline CO_2 emissions at the facility or source level from all direct and indirect sources and activities, including operations and bulk power transactions, using CCAR's web-based Climate Action Registry Reporting Online Tool.[2]

2. Obtain certification of DWR's resulting GHG Emission Report by a certifier approved by both the CCAR and the ARB by December 31, 2008.

3. Quantify and report at least 95 percent of total direct and indirect CO_2 emissions from the SWP power transactions, electricity used at DWR-owned buildings, and fuels such as diesel, propane, and gasoline utilized by DWR-owned vehicles and backup generators.

Reports of emissions associated with DWR operations will be based on CCAR's General Reporting Protocol, General Certification Protocol, and the Power/Utility Reporting Protocol, which focuses on GHG emissions for the electric power and utility sectors. DWR will report emissions using these protocols, including:

1. Indirect CO_2 emissions that result from market energy purchased to convey water with the SWP's facilities.

2. Indirect CO_2 emissions associated with energy the SWP imports into California from Nevada Power Company's (NPC) coal-fired generation facility, Reid Gardner Unit 4 (RG4), based upon NPC's mandatory quarterly emissions reports to the U.S. Environmental Protection Agency Clean Air Markets Division.

3. Indirect CO_2 emissions from DWR owned and leased buildings that are owned and/or under DWR's operational control, such as energy purchased from Investor Owned Utilities or the Department of General Services, are based upon DWR's billing records, and CCAR's recommended methodologies where specific usage data is unavailable.

[2] The remaining five GHGs covered in the Kyoto protocol (CH4, N2O, HFCs, PFCs, and SF6) are required to be reported after three years of Registry participation.

4. Direct emissions for DWR vehicles and SWP equipment that are owned and/or under the operational control of DWR are derived from DWR's fuel purchases records.

5. Other direct and indirect CO_2 emissions identified as part of the DWR's carbon footprint that are the result of miscellaneous activities.

DWR's 2006 Carbon Footprint

The SWP is the third largest generator of clean hydropower in California. DWR developed and administers a comprehensive power resources program for the strategic timing of generation and pumping schedules, purchase of power resources and transmission services, short-term sales of energy surpluses, and studies of resources for future needs. The SWP's 2006 energy portfolio was made up of the following constituents:

Hydroelectric Generation

Clean low emitting hydroelectric generation provides a large portion of SWP power resources. The 900 megawatt (MW) Hyatt-Thermalito Pumping-Generating complex generates about 2.2 billion kilowatt-hours in a median water year. Generation at existing SWP aqueduct recovery plants (Gianelli, Alamo, Devil Canyon, and Warne) varies with the amount of water conveyed.[3] Total rated capacity for the recovery plants is 794 MW; the average generation over the five year period from 2002 through 2006 for these plants is 1.9 billion kilowatt-hours.

Coal-fired Generation

Since July 1983, DWR has received energy from Reid Gardner Powerplant, a coal-fired facility near Las Vegas, Nevada. Reid Gardner consists of four units. DWR has a participation agreement for ownership like rights to 67.8 percent of Unit 4, while NPC owns the remainder of Unit 4 as well as Units 1, 2, and 3. Under the Agreement, DWR receives up to approximately 235 MW from Unit 4 (90.4 percent of the unit's capacity), subject to NPC's right to interrupt DWR's energy deliveries. This contract expires in July 2013 and DWR has formally notified NPC it will not renew or extend the contract.

Contractual Resource Arrangements

Through joint development, exchanges, and purchases, DWR acquires capacity and energy for SWP operations. Some agreements allow DWR to sell, buy, and/or exchange short-term firm capacity and/or firm energy on an hourly, daily, weekly, or monthly basis. The agreements permit more efficient use of the DWR's generating resources and scheduling of deliveries.

[3] Gianelli Pumping-Generating Plant is a joint DWR and U.S. Bureau of Reclamation (USBR) facility; DWR's share is 222 MW; USBR's share is 202 MW.

Joint Development Agreements

In 1966, DWR contracted with the Los Angeles Department of Water and Power (LADWP) for the joint development of the Castaic Powerplant. Officially part of the SWP system, the Castaic Powerplant produces hydroelectric generation and is operated by LADWP. The plant is electrically connected to their system at the Sylmar Substation. SWP receives capacity and energy based on weekly water schedules.

Power Exchanges

DWR contracts for the energy output of five small hydroelectric plants owned and operated by the Metropolitan Water District (MWD) of Southern California for a total capacity of 30 MW. These are located at Lake Mathews, Foothill Feeder, San Dimas, Yorba Linda, and Greg Avenue in the greater Los Angeles area.

Purchase Agreements

DWR obtains energy through long-term and short-term purchase agreements with utilities in California, the Northwest, and the Southwest, including:

- A run-of-river 165 MW Pine Flat Hydroelectric Powerplant, owned and operated by the Kings River Conservation District (KRCD).

- The 1988 Coordination Agreement between DWR and MWD, allows DWR to purchase surplus hydroelectric energy from MWD's Colorado River Aqueduct system.

SWP generation mix in 2006 reflects DWR's acquisition of two medium-term market contracts for off-peak energy of 100 MW through 2010, and 200 MW through 2015.

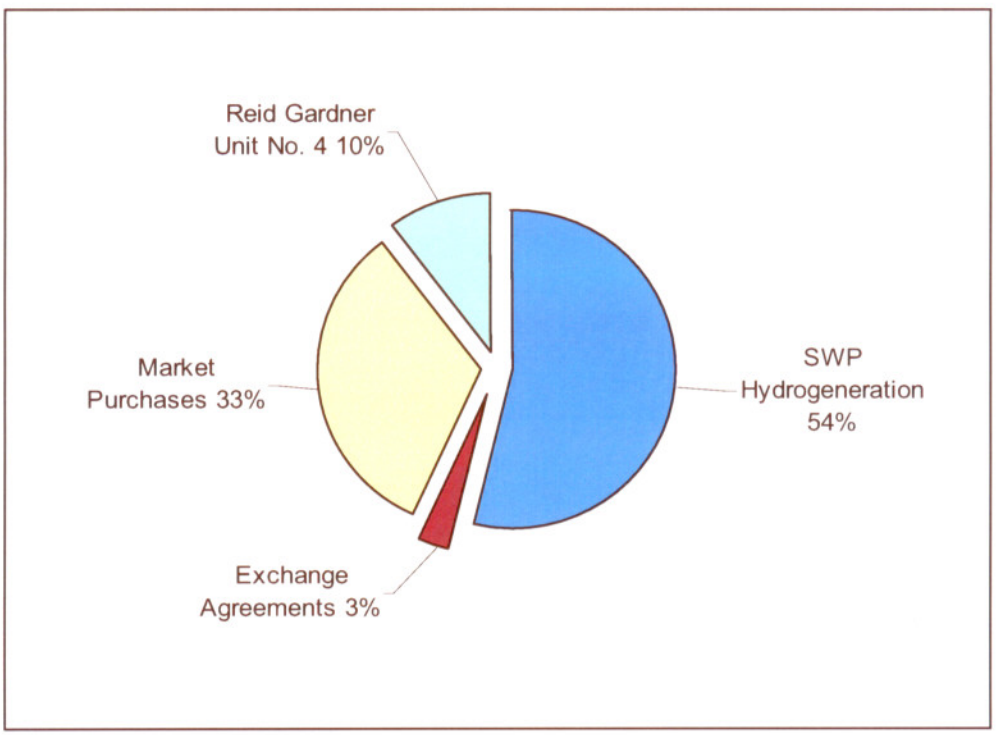
The SWP's 2006 resource mix is summarized in Table 1.

Table 1. DWR 2006 Energy Sources

DWR Generation Used in 2006 to Convey Water	
Source	**GWh**
Oroville (Hyatt-Thermalito)	3,631
Gianelli	165
Warne	293
Devil Canyon	1,434
Castaic	442
Alamo	88
Mojave Siphon	95
Pine Flat	723
Small Hydro	154
SWP Hydrogeneration	***7,025***
Less Sales & Exchanges	***3,754***
Net Hydro Generation	**3,271**
Exchange Agreements	367
Market Purchases	4,335
Purchases & Exchanges	***4,702***
Reid Gardner Unit No. 4	1,349
Non-Hydro Imports	***1,349***
Grand Total	**9,322**

Figure 1 depicts the proportion of each resource that DWR utilized to convey water in 2006.

Figure 1. DWR 2006 Energy Sources



Based upon the data enumerated in Table 1, estimates for the CO_2 emissions associated with the SWP 2006 portfolio are summarized in Table 2, using the emissions factors and guidelines cited in the CCAR's General Reporting Protocol. Consistent with the CCAR protocol (which also integrates data sources from three federal agencies: the Environmental Protection Agency (EPA), the Energy Information Administration (EIA), and the Federal Energy Regulatory Commission (FERC)), hydroelectric, nuclear, and renewable energy resources are assigned zero carbon emissions factors. SWP's purchases and exchanges from unspecified sources are estimated using the published emissions rates of counterparties who filed with the CCAR in 2007,[4] and the CCAR recommended Western Electricity Coordinating Council (WECC) regional default factor for CO_2 Emissions in California.[5] Reid Gardner Unit No. 4 CO_2 emissions were retrieved from the EPA Clean Air Markets Division (CAMD) database.[6] This data was used to ascertain the level of emissions for the actual energy imported into California by DWR from Reid Gardner Unit No. 4.

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[4] With the exception of one counterparty, whose emission rate reported to the CCAR was only available for 2005.

[5] Emissions & Generation Resource Integrated Database (eGRID), eGRID2006 Version 2.1, April 2007 (Year 2004 data).

[6] NPC reports emissions to the EPA CAMD on a quarterly basis, based upon direct measurements acquired through its continuous emissions monitoring (CEM) system.

Table 2. SWP CO_2 Emissions in 2006

State Water Project CO_2 Emissions in 2006		
Source	**Average Annual Emissions Rate (Metric Tons CO_2/MWh)**	**SWP Annual Emissions (Million Metric Tons CO_2)**
2006 Reid Gardner Unit 4	1.30	1.754
Market Exchanges	0.29	0.106
Market Purchases	0.37	1.621
	Total	**3.481**

Conclusion

DWR will continue its role as the State's third largest generator of clean hydropower. DWR is currently investigating ownership interest and contractual agreements to not only replace its resources provided by coal generation, but also to reduce its use of fossil fuels. This can be accomplished with a combination of cleaner, more efficient resources, including renewables, and improvements to the SWP system. DWR's membership in the CCAR, as well as the ARB's reporting regulations which integrate and expand upon the CCAR's standards, will provide a consistent and transparent reporting mechanism of DWR's CO_2 emissions and its progress in meeting California's GHG emissions reductions goals.